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EDITORIAL DEPARTMENT NOTE

The relation of cost and industrial accounting to management has been emphasized frequently in N. A. C. A. publications. There is no phase of management where the cost accountant can be of greater service than in the matter of cost control and reduction. This is very well illustrated by the suggestions for cost control mentioned in the article by Ralph G. Wells contained in this issue of the Bulletin.

The author of this article is both a Consulting Management Engineer and Professor of Industrial Management at Boston University. His broad industrial experience in the leather, furniture and textile industries has been supplemented by special organization and research work in various industrial and commercial organizations in New England. Mr. Wells joined the Business Administration faculty of Boston University in 1919, became Head of the Management Department in 1925, and Director of the Bureau of Business Research in 1929. He is the author of several articles published in professional and trade magazines and a contributing editor of *American Business Practice* published by Ronald Press Co. (1931). The present paper was delivered by Mr. Wells before our Providence Chapter.

The publication in the Bulletin of January 15 of an article by Jonathan N. Harris entitled "What Did We Earn Last Month?" has been followed by considerable discussion of the ideas presented there. In this issue, "Our Open Forum" contains statements of some of the diverse views which have resulted from the publication of this article. We shall be glad to have your comments.

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MARCH 15, 1936

COST CONTROL FROM THE STANDPOINT OF THE OPERATING EXECUTIVE

By Ralph G. Wells, Head, Management Department, Boston University, Boston, Mass.

FROM the standpoint of the operating executive there are three major activities in controlling costs, namely:

(a) Reduction of each item of cost and expense to the lowest reasonable point, usually accomplished through a detailed study of every cost and expense factor.

(b) Setting up of adequate and accurate cost standards as a guide and indicator to show the limits within which the use of time, of material and of money must be kept. These standards also serve as a yardstick by which actual day-to-day performance can be measured.

(c) Maintaining effective control of all factors influencing costs as a means of keeping expenditures within the standard allowance.

To secure the maximum degree of effectiveness from the foregoing activities it is essential that the firm have a comprehensive cost accounting system designed to supply accurate detailed cost data regarding every operation and every phase of the business. Standard predetermined costs are preferable because they facilitate frequent comparison of actual costs with the standard to be maintained. This frequent comparison is one of the most effective means of cost control, yet a surprising number of firms neglect to use cost data effectively for this purpose.

Use Cost Records to Control Costs

Some time ago Professor Atlee L. Percy, of our Accounting Department, and I made an effort to determine whether or not many firms were making actual use of their cost data as a means of cost reduction and cost control. We arranged for a graduate student in accounting to interview the cost men of a number of leading organizations. To our surprise relatively few of the firms sent the data collected by their cost department to production

executives or made any regular direct use of it to discover where costs were excessive and economies could be effected.

Fortunately, however, there are firms who make effective use of this information. An excellent illustration of this is to be found at the Towle Company of Newburyport, manufacturers of sterling silverware. Here the superintendent has on the walls of his office charts for each department showing a comparison with standard costs of the actual direct labor, direct material and overhead within the control of the foreman for each week in the year. A straight line on these charts represents standard on each item and a curve plotted each week by the cost department shows variations above and below standards. From these charts the superintendent and the foreman can tell at a glance whether or not serious variations are occurring in any department.

Another effective use of cost standards as a basis for control is to translate labor costs for each operation into terms of standard time allowed for the task and also material costs into the number of units of material allowed. These standards (showing the amount of allowed time and material) can be stamped or written on each work order or job ticket as a guide and a goal for the foreman and the operative. When the task is completed it is a simple matter to enter on each ticket or order the actual time taken and the amount of material used.

This immediate comparison by the production department of the actual with the standard shows up variations promptly without waiting until the cost department has had an opportunity to figure them out. Furthermore, it is easy to devise a method whereby variations shown by this comparison can be plotted and serious departures from the standard called immediately to the attention of the proper official. This gives an opportunity to correct without delay the causes or conditions increasing costs.

This immediate comparison and prompt correction of adverse influences is far more effective than any post-mortem examination made two or three weeks after the "crime has been committed." Post-mortem inquiries into causes of variation are frequently useless. Few production men can remember clearly after an interval of several days or weeks what the particular conditions were that caused higher costs.

Methods of Controlling Overhead

In a similar manner overhead costs within the control of department heads can be held at a minimum by frequent regular comparison of actual expenditures with standards or with budgetary allowances. To do this effectively, overhead should be divided into three groups:

(1) Fixed charges not ordinarily possible of reduction.
(2) Minimum overhead necessary to keep plant open and ready to serve customers.
(3) Variable overhead within the control of department heads and fluctuating somewhat in proportion to sales or production volume.

These groups should also be broken down into as many individual items as is feasible, first, for comparison and, second, as a basis for cost reduction studies. The recent depression has taught us that there are few overhead items which are not capable of some decrease if the effort in that direction is sufficiently determined. Even insurance, taxes, and interest charges can be cut. You will recall instances where buildings have been dismantled and torn down to eliminate many items of burden previously accepted as almost inevitable.

Each department head should be supplied with figures showing the standard or budget allowance for every overhead item within his control and a monthly comparison of the actual expenditures or charges with the standard for these items. Department heads should understand that their effectiveness is judged by the savings they make in overhead as well as in prime costs.

Old-Fashioned Budget Method Less Efficient

It is hardly necessary here to mention the importance of budgetary control as the main foundation upon which expense control and expense reduction should be based. In this connection, reference should be made to the rather useless and highly inefficient procedure formerly followed. The old-fashioned way of budget building was to call upon department heads for estimates. These were then combined and after study cut down to correspond with income. Naturally the practice of padding estimates up to the maximum reasonable amounts developed. Department heads hoped

that by asking for larger amounts than were actually needed they would get more in the end than if they specified a reasonable sum. Neither was there any particular incentive for economies. Any amount saved would be lopped off of next year's appropriation.

Modern procedure removes the incentive to overstate requirements. With standard predetermined costs based on detailed analysis of past experiences supplemented by exhaustive engineering studies, uncertainty in budget building is removed. Future expenditure can be calculated with surprising accuracy. Variations due to changing business volume can be provided for through the use of ratios based on sales or production volume. Thus a department head can be given definite standard allowances sufficiently flexible to take care of all normal fluctuations.

Use Rating Scale to Encourage Economies

Along with the modern budget procedure there frequently goes some special form of incentive which rewards the department head for economies suggested or effected. Such procedure insures sound businesslike control of expenditures based on accurate knowledge of actual needs. It stimulates genuine far-sighted economy which spends freely where expenditures will produce increased profits but avoids waste and extravagance.

As a further means of controlling effectively the various costs of a production department, I recommend the use of a rating scale for operating executives and foremen similar to one developed by a large machinery manufacturer. In this organization each department, figuratively speaking, is set up as a separate business. All labor and material costs, as well as overhead are charged to each department and it is given credit on a predetermined basis for its product. This procedure indicates accurately whether or not each department is being run on a profitable basis and its expenses kept below the standard costs allowed for the merchandise which it produces.

Cost Standards Must Be Accurate

Obviously, cost standards which serve as a basis for cost control as well as selling price must be accurate. The importance of this point cannot be emphasized too much. It is surprising and

somewhat discouraging to find how careless many people are in the setting of standards.

A few years ago a manager of a large plant came into my office one day and said: "We have a very detailed cost accounting system installed and operated by a C.P.A.; all our prices are based on these costs. According to his figures we should have made a profit of $30,000 during the last fiscal period. Instead we have a deficit of $18,000. We have sold enough goods and there have been no reductions in prices or excessive discounts—what is the trouble?" After some preliminary investigation the cost man of this firm was asked how his cost standards were set. His reply was: "I secured the cost of many of these items from foremen. In the majority of instances where we did not have actual cost records available the foreman would estimate the quantity a workman could produce in an hour and the amount of material that would be required." An analysis proved that more than half of his cost standards had been set on the basis of foremen's guesses. When we figured up the actual cost of labor and material for the period and compared it with the amount that would have been spent if his cost standards had been correct, the cause for the deficit was readily apparent.

In another instance, a candy manufacturer formerly based his costs on trial runs. His practice was to call the factory and tell them that right after lunch he wanted to make a trial run of a thousand pounds of a certain item. Naturally, everyone in the department would drop all other activities and prepare for that trial run. When the proprietor arrived everything was in readiness and all the workers were "on their toes." Machines carefully cleaned stood ready and materials properly measured were at hand. Obviously, the costs secured by such a trial run were lower than any that could be maintained under ordinary conditions of production.

Use Time Studies To Test and Revise Standards

Were there time, numerous other examples could be cited indicating that many firms set standards inaccurately. From the production standpoint the cost standards should be determined either on the basis of past experience, calculated on actual records covering a sufficient length of time to include all possible variations, or

by detailed time and motion studies. Wherever possible, cost standards should be checked by actual job and operation studies. These studies frequently disclose new economies and show how past errors can be corrected. One advantage of standard predetermined costs is that standards are constantly being tested by comparisons with actuals.

In calculating standards the "mode" or item of greatest frequency should be chosen rather than the "mean" or arithmetic average. Cost standards based on the arithmetic average are inaccurate to the degree that they include unusual variations; they are not as truly representative of the normal results to be expected and obtained under actual conditions as the item of greatest frequency.

In order that cost standards may represent the lowest possible figure that departments may be reasonably expected to maintain under normal circumstances, they should be based on detailed engineering analysis of each factor and item involved. Such detailed job and time studies are vital in reducing expenses and keeping costs down to a point where price competition can be met and a profit still shown.

Every item of expense and cost needs to be studied thoroughly by an engineer or other competent person to determine by analysis, by experiment, or any other form of research, what further economies can be made.

Until these engineering studies are made you cannot be sure that your costs have been reduced to the minimum. Even then it is surprising to find how many further savings can be made by occasional re-studies.

Cost reduction is frequently accomplished through attention to a number of small details, any one of which may seen insignificant but which in the aggregate may mean the difference between a profit or a loss. "If you don't at first succeed, try, try again."

I regret that there is not as much time to devote to the subject of cost reduction studies as its importance deserves.

A discussion of the detailed procedure (step by step) whereby every item of labor, material, and overhead costs is examined minutely is fascinating but would take too long. In many firms, cost standards are set by the engineering department on the basis of cost data supplied by the accounting department.

Cost Records Must Account for Every Cent Expended

In order that standards may be accurate it is necessary that the cost system be sufficiently comprehensive to account for every expenditure and depreciation or similar charge, not only in the manufacturing division but in every other part of the business. Cost accounting methods should be applied to sales, to office expenditures, to administrative activities and every other phase of the business, even more than to manufacturing. For this reason the cost system should be sufficiently comprehensive to cover every phase of the business and be so tied in with general accounts that every expenditure or charge of any nature will be distributed to the proper account.

Why "Pick" on the Production Department?

It is discouraging to executives in the production department to have every item of their costs gone over with a fine-tooth comb and examined with a magnifying glass if the same care and thrift is not shown in handling expenditures in other divisions of the business.

The operating department should be relieved of the responsibility for many expenditures which ought to be charged to other departments. As an illustration: Excess costs, due to overtime or frequent changes in machine set-ups resulting from rush orders or the putting through of merchandise orders in small lots, are usually a responsibility of the sales department. Changes in the regular schedule made to accommodate special customers should be charged to sales or customer goodwill. It is inaccurate as well as unfair to saddle the production department with increased costs due either to lack of sales planning or the eagerness of the sales department to please special customers.

Unit Costs More Important Than Total Costs

It is vital to the success of cost control that we think in terms of unit costs rather than total costs. Usually, the toal amount paid for labor and material or overhead is of less importance than the cost per individual unit. Detailed unit cost records show up variations in cost quickly and therefore make it easier to judge the relative value and importance of increases or decreases in numerous items of expenditure.

Many executives are blinded by total costs. They fail to realize that additional expenditures for a better grade of labor or a less wasteful type of material may actually result in greater output per hour and a larger number of products per unit of material. Similarly, overhead expenditure for planning, scheduling, or other facilitating services may also prove profitable investments through the reduction in idleness of men and machines and an increase in the total hourly output.

Do Not Confine Cost Reduction Efforts to Labor and Material

Unfortunately, there are still many who believe that the principal sources of cost reduction are to be found in labor and material. This belief has been so long prevalent in many quarters that there is a question as to whether or not profitable limits have not been reached. In many lines greater opportunity for economy can be discovered among overhead expenditures and in the improvement of management practices.

One of the purposes of this paper is to direct attention to the fact that there are many ways of reducing costs other than cutting labor and material expenditures. In certain quarters, particularly among bankers and other financial executives who have had little or no operating experience, there is a tendency to believe that the first and only point of attack when costs must be reduced is either labor or material.

For this reason, much of this paper will be devoted to giving examples and illustration of other ways and means of decreasing costs.

As previously indicated, many of the largest economies are being effected through changes in management policies and practices.

Large Manufacturer Reverts to Small Shop Methods

Here are two illustrations of savings resulting from such changes. A large manufacturer of jewelry and optical goods recently decentralized his manufacturing operations. Formerly his entire plant was departmentalized by operations, each department confining itself to similar operations or processes. With the advent of the depression he began to feel the competition of small shops. To meet this competition he was forced to completely rearrange his plant and break it down into a number of small, self-contained

shops. Each of these shops or departments confines itself to the production of a few types of products similar in process but with the usual variations of size and minor differences in design. All operations on a given product are thus performed in one room.

Several economies have resulted from this rearrangement, viz: (1) Manufacturing time has been reduced from three weeks to one week. (2) Practically all interdepartment transportation costs are eliminated. (3) Planning and scheduling is greatly simplified. (4) Competitive conditions in this line forced firms to give customers immediate delivery upon receipt of order. To make prompt deliveries it was necessary to carry an inventory of each item equal to a three weeks' supply (the length of time formerly required to put a replenishment order through the factory). The reduction in the manufacturing time made it possible to reduce finished inventories to one-third of their former size. Work-in-process inventory was also reduced to one-third of the former size.

Saves Money by Buying Peak Requirements Outside

Another illustration of economy resulting from management foresight and planning occurs in the case of a large manufacturer and user of cotton goods. Instead of maintaining sufficient plant capacity to take care of the requirements during peak periods, he has three or four small mills, each confining itself to a single group of products. Their combined capacity equals merely his normal requirements throughout the year. These plants run steadily at full capacity practically fifty weeks each year. Any additional cloth needed from time to time, particularly during rush seasons, is purchased in the open market. He seldom has to pay any premium over his own costs and not infrequently secures a slightly lower price.

Thus by confining his total plant capacity to normal requirements and buying excess needs in the open market, the manufacturer is free from all the expenses of idle plant equipment. It is small wonder that this organization has avoided during recent years the serious deficits so disastrous to many other firms.

First Steps in Cost Reduction

The first step in the reduction and control of production costs starts with the planning and designing of products and the selec-

tion of the general line of merchandise to be sold and made. Simplification in design and in the number of varieties should be sought for.

Specifically, this means the selection of merchandise items which can be made in sufficient quantities to avoid frequent expensive changes and set-ups, and to give the production department those long runs which keep costs down.

It means the elimination of slow-moving and non-profitable items and, in so far as possible, the elimination of small, as well as special orders, unless the customer is willing to pay for the added expense. The objective is to develop and select a well-rounded group of items which will keep the factory running on a fairly even, well-balanced schedule, with just as few seasonable fluctuations as possible. It means the elimination likewise of rush items and small lots of varying design made for the customer's accommodation. Every change in the adjustment or set-up of the machine costs money and retards production.

In the designing of products, care should be taken to avoid those numerous little details in design and construction which increase the cost of making an item out of proportion to the added sales value.

Another important source of saving lies in the selection of the types of material which can be run with the greatest ease and the least waste. It is important also that the material be uniform, reasonably easy to obtain, and of a size than can be worked up without too much waste.

Merchandise Committee Effects Economies Through Coordination

In order to secure the best results in planning new products it is desirable to have a merchandising committee on which the purchasing, production, and sales departments are represented. By bringing together in this coordinated manner the judgments of these various groups, you will be able to develop a line of merchandise of sufficient sales appeal on which you can keep your production costs down to a reasonable point.

Such a committee also facilitates the development of a comprehensive merchandising program for the entire company, together with the necessary coordinated departmental schedules. The de-

velopment of a well balanced merchandising program insures that all departments will keep in step with the major plan.

Comprehensive "master planning" of this nature provides a coordinated schedule for each department to follow and eliminates a great deal of waste and lost motion. It synchronizes purchasing, inventory control, manufacturing schedules, sales programs and financial plans into a systematic, comprehensive plan, and the full force of the entire organization is directed towards a common end. It is also the foundation upon which the best forms of budgetary control are built.

Use Economic Lot Size Formulas

An important phase of this coordinated schedule often overlooked is the value of a planned purchasing program carefully tied in to production requirements to make sure that there will always be sufficient material on hand to avoid delays due to material shortages, while at the same time inventories are kept down to the lowest reasonable point. In connection with the development of these schedules the use of economic lot sizes will prove an advantage. Those who are not familiar with the formulas used for this purpose will find it profitable to study the savings to be gained from the determination of the most economic quantities in which certain types of material should be purchased; the most desirable quantities of each item to be carried on hand and the correct size of lots in which each item of product should be scheduled through the plant. It is also desirable to determine the minimum size of customers' orders which it is profitable to handle. While we cannot refuse orders for small quantities from good customers it is always possible to avoid solicitation of business from firms whose business is given in such small dribs that the cost of handling each order is greater than the net profit.

Many Recognized Aids to Cost Reduction

Studies to improve processes, eliminate waste, and select the shortest and best method of performing work is another well-known method of lowering costs. In the same category lies the careful planning of layout and arrangement of equipment and the movement of material. The advantages to be gained through the straight-line flow of production, through the use of automatic

machines and conveyors, and through the planning and scheduling of internal transportation, are so well known that it is hardly necessary to do anything more than mention them in passing.

In this connection the importance of prompt and adequate maintenance of plant and equipment should be stressed. Production costs are frequently increased by inferior or deferred maintenance. Equipment not in good running order is a common cause of waste and delay. Many organizations find it an economy to shut down their plant for two or three weeks during dull seasons in order that the plant may be gone over thoroughly and every piece of equipment overhauled sufficiently to put it in first-class operating condition. This annual shutdown also provides an opportunity for vacations and does away with the inconvenience of having a part of the force away on vacations during busier periods.

Another source of economy is the reduction of overall manufacturing time as a means of speeding up both capital and material turnover. In their eagerness to reduce the time in which tasks are performed, executives frequently overlook the fact that usually more time is lost between operations than during operations. Considerable attention should be given to the devising of ways and means to eliminate delays between operations. The increased use of automatic conveyors, straight-line production and "chain" assembly methods in modern plants illustrates some of the steps that are being taken to eliminate the loss of time between operations.

As an example, one of the more successful manufacturers of men's shoes has succeeded in reducing manufacturing time on a case of shoes to six days. This manufacturer ships all orders within six working days after receipt, while in many shoe plants two to three weeks are required in which to make and ship orders.

"Time Is Money," Delays Increase Cost

Nearly all cost and expense items are incurred or accumulated upon the basis of elapsed time. Hence, anything that causes delay or loss of time, either in the production, distribution, or sale of merchandise, increases its cost; while usually anything speeding up or saving time is an economy.

Waste elimination is another well-recognized means of saving money. In many plants the actual dollars and cents lost from the waste of time through idleness of men, machines and materials is

often greater than the waste of materials. Losses from material waste are more tangible and therefore make more of an impression because they are easily seen. While careful attention should be given to the elimination of all forms of material waste through the redesigning of products, the elimination of seconds and spoiled work, and the improvement of processes, nevertheless it is equally important that all work be planned and scheduled to avoid the money losses that are occurring due to the idleness of men and machines waiting for work and the delays in the moving of material from one job to another.

"Quality" More Frequently an Economy than an Expense

There is a popular fallacy to the effect that it costs money to maintain quality in manufacturing, whereas it is often cheaper to maintain quality than to allow slipshod or careless methods which produce a number of seconds or result in the spoilage of work. In manufacturing, quality usually means uniformity. Once the grade of a product has been established it is real economy to maintain this grade without deviation. The production of seconds or the waste of labor and material through poor workmanship is expensive. In calculating the loss from seconds and spoiled work, the cost of labor and overhead already expended on the material or product should be included. Often it will be found that this loss is greater than would have been the cost of maintaining the necessary supervision and inspection. Executives who are interested in reducing and keeping down their costs will find the introduction of whatever control methods are necessary to maintain quality a profitable investment.

For this reason one well-known manufacturer has installed a bonus system which encourages the workers to lay aside any spoiled work which reaches them before they spend any time on it. The worker is compensated for this inspection of work as it reaches him by being paid the same amount for pieces laid aside that he would have received for performing his work upon them.

Many Factors Affect Costs

When it comes to the actual control of production there are an unusual number of factors to be dealt with. Unless one has actually shouldered the responsibility of supervising manufacturing

processes and seeing that the maximum quantity of work is turned out in a given time and quality maintained he cannot appreciate how many things can go wrong. Many of these are beyond the control of the production department. Last-minute changes in sales orders, power house difficulties, shortage of material of parts purchased from distant vendors, breakdown of antiquated or dilapidated equipment which the owners are unwilling to replace, are but a few isolated examples. As an illustration of the many factors with which the production man has to contend, there is given at the end of this article a list prepared by a group of foremen. Some of these items affect quality primarily, but the larger proportion have a direct bearing on costs. In a well organized plant some provision has to be made to insure that each one of these factors or conditions is taken care of properly if costs are to be kept down. Usually an ounce of prevention is worth a pound of cure. No production man can maintain his costs anywhere near standard if he does not anticipate the majority of adverse conditions that may arise, take steps to prevent them, and be prepared for immediate action when the wrong thing happens.

This is the acid test which determines the successful production executive. Can he so organize his work that he will be able to avoid practically all of the adverse combination of conditions and circumstances that may occur and keep his department running smoothly and effectively at all times?

To accomplish this the production executive must set up numerous standards to be maintained and devise ways and means of controlling each factor so that the standards will not be upset. This applies only to those things which are entirely under his control. An examination of the list will disclose numerous items which are responsibilities of various other departments. Still other important factors lie solely within the province of chief executives and administrative officials.

Management Must Supply Leadership

Clearly then, the management itself must assume the leadership and the responsibility for such action as is needed in installing whatever standards and control systems are required to control properly all of the factors affecting time, quality or costs which lie beyond the authority of the individual supervisor or foreman.

Let us then examine this list to determine what steps are needed to control effectively some of the more important factors. It is obvious that certain general steps to be taken can be suggested as applying to the majority of the factors.

Steps in Cost Control

1. The first of these steps would be a thorough job and operation study of every phase of the process in the plant to determine what standards need to be established regarding each item listed, and the most effective means of maintaining this standard or avoiding the adverse condition.
2. The next step would be the setting up and establishing as standard practice whatever procedure was required to maintain the standards or avoid adverse conditions.
3. Following this, every employee affected should be given thorough instruction, and if desirable careful training regarding the standard practice to be observed.
4. Simultaneously and as a part of the training program the interest and cooperation of all workers in maintaining the standards should be secured by whatever means are available and effective. It is largely the job of the foreman to "sell" the idea to his employees and to keep them sold.
5. Provisions will also be needed to see that there is adequate supervision and inspection. This involves, of course, the training of supervisors and inspectors in the details and responsibilities of their jobs.
6. In some instances it will be found advantageous to install some system of incentives and rewards for faithful performance of, or adherence to, the standards supplemented by discipline and discharge for failure to comply. The incentive should be extended to include both supervisors and inspectors.
7. Supplementing all this there should be installed whatever control devices, systems or checks are required to keep track of the degree to which standards are maintained and to provide the necessary reports to proper officials.
8. It will be observed that many of the conditions desired can be secured and the undesirable ones avoided by careful preplanning, advance preparation and preliminary inspection by responsible employees.

Recognized Methods of Control

It will be noticed that the factors in the list are grouped by several major classifications There are certain recognized control methods relating to some of these classifications which have been developed as a result of long years of experience, and which are generally accepted. The installation and use of these will take adequate care of many items.

Among the recognized control methods referred to above are the following:

1. Material Control

   This includes the establishment of purchasing specifications for all materials and supplies, provision for inspection on arrival, the setting up of standard practice procedures covering storage, handling and preparation for use. It also includes—

2. Inventory Control

   Through the use of maximums and minimums, this method insures that adequate quantities of material are on hand as needed, while inventory investments are kept at a minimum. It also avoids tying up capital in slow-moving or obsolescing material. To insure accuracy of records and protection of material, inventory control should be supplemented by—

3. Centralized Stores Control

   All stocks of material, regardless of location, should be under complete control of a central stores department and nothing issued or used for any purpose whatever except by duly authorized requisition.

4. Coordinated Transportation

   Central planning and scheduling of the transportation and handling of material from freight terminals to warehouses and stores, as well as internal moving of material and work in process, results in many economies. This should be coordinated closely with production schedules. Necessary checks and safeguards to prevent waste, loss, and theft, should be provided.

5. Centralized Control and Maintenance of Machines, of Tools, and of Supplies

All mechanical and physical equipment should be under the control of a strong centralized engineering department charged with the responsibility of designing and perfecting equipment, recommending changes to keep mechanical equipment and processes up to date, eliminating obsolete and worn-out machines and accessories, and the prompt maintenance and repair of mechanical equipment to keep it in good running order. In large plants this department is frequently responsible for all set-ups and changes. Alterations in plant layout and arrangement is also a responsibility of this department.

6. Improvement and Standardization of Methods and Processes

In every organization there is need of a "Methods" or "Standards" department to improve and perfect processes and performance methods, to set standards of all kinds through time and motion study. The functions and responsibilities of this department cover a wide range, including "trouble shooting," ascertaining and eliminating causes of waste and of delay. This department should be continually on the alert for "shortcuts" and for less expensive processes, as well as all types of "betterments."

7. Merchandise Planning and Control

As indicated in the first part of this paper this activity serves to coordinate sales and production as well as the activities of all other departments in support of a unified program of carefully planned merchandising and manufacturing. It eliminates duplication of effort and lost motion. It avoids shortage of merchandise as well as frequent changes and rush orders. It ties in closely with and provides the master schedule for—

8. Production Planning and Scheduling (Production Control)

So much has been written and printed regarding this activity that readers who are interested can find ample text material relating to it. Careful preplanning and scheduling speeds up all activities, avoids delay, secures maximum utilization of men and equipment. It anticipates and avoids errors through thorough advance preparation. It is just as essential in business as are "timetables," "running cards,"

and "train dispatchers" to the efficient operation of a railroad.

9. Labor and Personnel Management

As in the case of production control, the interested reader will find ample text material regarding this activity which saves money and helps in cutting down unit costs in many ways. Through the selection of more efficient employees, through the elimination of sources of friction, dissatisfaction, and the causes of labor trouble, through the training and development of workers, and through a wide variety of activities which heighten morale, increase loyalty and develop esprit de corps, this activity is of material assistance to executives in developing a more effective working organization. Nothing contributes more to cost reduction and expense concontrol than an efficient, well-trained, and loyal group of employees.

While there are numerous other types of control mechanisms available, the foregoing comprise the more important ones. Although the list of factors which must be controlled, if cost and expenses are to be kept down, appears rather formidable, nevertheless there has grown up as a result of the combined experiences of many firms numerous recognized methods of accomplishing the desired end.

Cost Control More Than a System of Records or Accounst

From the foregoing statement regarding costs and their control it is apparent that the adequate control of cost transcends the boundaries of our accounting systems and includes in its activities nearly every phase of management. Really, the reduction and control of costs is a major responsibility of all executives, department heads, and supervisors.

The cost department can point out the pathway to lower costs and supply all of the needed facts and figures, but every other department has its part to play and its responsibilities. After all, cost control is really a question of sound efficient management, together with the use of recognized methods and conformance to certain definite business fundamentals. Coupled with these must go sound practical judgment, careful supervision and inspection

plus that driving force and stimulating enthusiasm which guides and directs while it controls and keeps the wheels of effort driving ahead.

In our interest in methods and systems and our enthusiasm for their accomplishments we must not allow our confidence in their efficacy to blind us to the fact that systems, methods, and devices are but tools with which executives can increase their own capacity and ability. They are no better than the man who operates them. In the hands of skillful and capable men they seem to perform wonders, while in the hands of incompetents they become mere snarls of red tape, hollow husks of useless form. In the last analysis, the success of any of them depends upon the skill of the man who uses them.

LIST OF FACTORS AFFECTING QUALITY—TIME—COST

Prepared by a Group of Production Men

In order to maintain quality, keep costs down, and get work out on time, it is necessary to control effectively the various factors which have an influence on quality, cost, and the time in which work is done. A list of many of these factors is given below. It was prepared by a group of production men attending a recent course in Factory Management.

Factors
Material

Wrong kind or grade
Wrong condition
Wrong size
Wrong position
Not uniform
Not clean
Not ready
Not sorted
Poor quality
Poor handling and storage facilities
Too much waste
Poor use of waste
No stock
Shortage
Damaged
Loss by theft
Too large inventory
Too small inventory
Too many special materials
Poor transportation
Limited source of supply
Difficulty in machining
Weak purchasing methods

Factors
Machines and Equipment

Condition
Adjustment
Set-up
Speed
Lubrication
Power
Breakdown
Repair parts
Location
Position
Not enough machines
No machine available
Machine not ready
No tools
Poor tools
Wrong tools
Wrong machine
Obsolete machine
Wrong size
Adaptability
Flexibility
Not enough capacity
Poor jigs and fixtures
Tool breakage
Poor maintenance
Delayed and deferred maintenance
Inadequate repairs

Management

Inadequate records
Accidents
Lack of interest
Lack of tact and diplomacy
Lack of responsibility
Lack of incentives
Poor suggestion system

Management

No planning
Poor planning
Wrong routing
Poor delivery
Poor supervision
Poor inspection
Too much inspection
Lack of cooperation

Methods

Lack of standards as to
- Method
- Quality
- Time
- Speed
- Temperature
- Humidity
- Safety
- Size of lot

Poor workmanship
Spoiled work
Not uniform
Wrong way
Longer way
Inaccurate
Wrong count
Wrong work
Too much work
Too little work
Too many set-ups
"Cripples"

Labor

Wrong type
Not experienced
Not trained
Not skillful
Not honest
Not dependable
Not adaptable
Not interested
Poor instructions
Poor attendance
Poor wages
Wrong attitude
Too slow
Careless
Turnover too great
Long hours
Inharmony
Soldiering
Idleness
Ill health
Fatigue
Age
No help
Insufficient help
Too many
Better type than needed

Plant

Working conditions
- Light
- Heat
- Ventilation
- Humidity
- Noise
- Dust
- Odors

Layout
Floors
Benches
Chairs
Tool racks
Miscellaneous equipment
Housekeeping

Product

Variety
Quantity
Method of packing
Method of shipment
Design
- Poor
- Too many extra gadgets
- Too many changes
- Shape
- Color
- Finish

Note: Bibliography will be found on page 759.

OUR OPEN FORUM

One Vote in the Affirmative

Dear Mr. Harris:

Your article in the January 15 Bulletin has aroused my interest sufficiently to urge the penning of this line, the first article I have commented on in years.

I believe it sounds a new note in practical accounting. To me it seems like the sound of the bugle, calling us back for a further advance; or like the five blasts which call back the flagman for new progress on the rails.

Not to comment on the striking manner of presentation, it crystalizes thoughts which have run through my mind since an address I gave two years ago on the subject of "Utilitization." In the question period following this address, the questions asked and the facts admitted on my retorts, convinced me that this matter of standard costs had been carried to such excesses by some of the more enthusiastic proponents as to drift far afield from the beaten path of practicability. When they are unwilling to allow the benefits of a major increase in volume to become reflected in the cost of an article as used to corral business, I agree there's something wrong with the method.

In my accounting connections, I have stood for standard costs within reasonable and practical limits. I have not, however, condoned the extremes to which this principle has been carried by its more enthusiastic advocates.

I noticed that in our industry, only one out of the fifty concerns embraced, carried out the proposed uniform accounting (N. I. R. A.) practice to the extremes there recommended.

I am confident that in the next few years, the wide-awake business executive will move, as did the President in your article, for a more practical and sane application of the Standard Cost principle.

JOHN PAULY,
Hampden Paper Company,
Holyoke, Mass.

"A Method to Eliminate Unpleasant Conferences with the Boss"

Editor, N.A.C.A. Bulletin:

The article "What Did We Earn Last Month?" by Jonathan N. Harris, was read with a great deal of interest. The conversation of the Controller and the Boss fits in with many of the conferences between the writer and his superiors. Apparently other chief accounting officers have had the same difficulty in attempting to educate the Boss, only to be told that the accounting system is wrong, because you cannot turn a loss into a profit.

I recognize the fact that burden over- and under-absorbed is the disturbing factor, and it would be ideal to "level the hill over the valley," developing a more consistent operating statement; however, it would appear that we are looking for a way out to present a satisfactory operating statement which will not bring forth the wrath of the Board of Directors.

Let me ask what will happen if higher hills are created, which will more than fill the valleys? What happens to the unabsorbed portion? During

one of the depression years, the writer was not permitted to take into consideration the unabsorbed burden, going on the theory that it would be taken care of in months which reflected an over-absorption of overhead. Unfortunately, the over-absorption of overhead failed to materialize and at the end of the year the total accumulated unabsorbed overhead was written off. Fortunately for the writer, my chief superior, being a vice-president in charge of finance, was able to get this over with the balance of the directors. This is the only time we tampered with overhead. Each month we wrote off the discrepancy. However, the rate of overhead used was, as best as could be determined, a normal rate.

As I see it, the principal disadvantage in the submitted plan would be the effect of lower individual costs in the hands of the sales department. By excluding all fixed expenses as a part of direct cost, the wrong impression would be given of actual cost. Even when all legitimate factors of cost are included it is sometimes difficult to prevent the sales department from lowering prices, especially when they have in mind a price at which the article should be sold.

To sum it all up, it appears that the idea is to change the method of handling overhead to justify a figure for the Boss, which will eliminate at least some of the unpleasant conferences all of us have gone through when presenting monthly figures that show a loss. In the end, I am afraid the recommended change would require as much, if not more, explanation than the present recognized practice.

I will admit that my remarks have not been the kind that would shed much light on the subject, however, I would like to see more articles in this connection. If possible, I would like to receive opinions and other recommendations of getting around this monthly problem of over- or under-absorbed burdens.

KARL M. SHARP,
Knapp Brothers Mfg. Co.
Joliet, Ill.

"Let's Look at the Figures"

(Following are two memoranda which resulted from the publication of the article by Mr. Harris. Mr. Gilmour is connected with Canadian Industries, Ltd., of Montreal, Canada.)

TO: Vice-President ——

FROM: R. B. Gilmour.

With reference to your memo of 31st January, enclosing N.A.C.A. Bulletin No. 10 for my comments:

Frankly I do not agree with the article for the following reasons:

1. Cost statements would never show what the full costs of your products should be for comparison with selling prices.

2. A comparison of the two statements shows that the plant must have been practically shut down during the period in question, as there is a difference of only $1,652 between "Unabsorbed factory overhead" in the first statement and the total "Indirect factory expenses" plus "Variances" in the second statement. This is an exaggerated condition.

3. The difference between the "Standard cost of gross sales" in the first statement and the "Standard direct cost of sales" in the second statement is $36,033, representing the indirect expense applicable to the sales, which compared with the "Indirect factory expenses" plus "Variances" in the second statement shows that they sold in the month of October 26% more than a normal month's production, and that the write-down from

$180,166 to $144,133 amounting to $36,033 has been left on the books to be taken care of at some future date.

4. If this exaggerated condition between production and sales as shown for the month of October existed, it is fair to assume that the reverse would occur in some other month and that the loss would be increased by some $28,000 that actually belongs in inventory, and it is questionable whether "Mr. Stone" would enjoy having to explain this loss over and above the losses for Selling Expense and Administration Costs.

5. One of the advantages in the use of standard costs is that it sets aside the cost of idle plant capacity and treats it as a separate item from the cost of goods produced. This advantage is entirely lost sight of in the article by Mr. Harris.

6. With reference to the second paragraph on page 510 in connection with unabsorbed expense, if rates are based on normal plant capacity, and if this capacity exceeds potential sales, there will, of course, be unabsorbed expense until such time as the slack is taken up by increased sales of existing products, or by the development and sale of new products. This should be recognized. If rates are based on sales estimate, it would be quite sound to suspend the monthly unabsorbed and over-absorbed expense until the end of the year, in which case there would be no distortion of profits in months of low production and high sales or vice versa. The net amount of unabsorbed expense for the year could be closed out as a separate item and fully analyzed and explained at that time.

I am returning the Bulletin, herewith.

TO: Vice-President ——

FROM: R. B. Gilmour.

Some further comments on the Harris article:

1. A comparison of the "Standard cost of gross sales" in the "Condensed Income Account (old style)" amounting to $180,166 with the "Standard direct cost of sales" in the "Condensed Income Account (new style)" amounting to $144,133 shows a difference of $36,033, or in other words, 20% of the full cost of sales in Indirect Expense.

2. A comparison of the inventories of Finished Goods at September 30th, 1935, and October 31st, 1935 (page 520 in Bulletin), shows an inventory decrease of only $50,786 as against full cost of goods sold, $180,166.

3. Assuming that inventories of finished goods are carried at full cost, the full cost of goods manufactured in October would appear to be $180,166 (full cost of sales) less $50,786 (inventory decrease) or $129,380, of which 20% or $25,876 is Indirect Expense.

4. A reference to "Condensed Income Account (new style)" shows the total Indirect Expense for the month of October to be $25,872 plus $2,650 or $28,522. The unabsorbed Indirect Expense should, therefore, be $28,522 less $25,876 (see paragraph 3) or $2,646, and an analysis of this unabsorbed Indirect Expense shows:—

Productive Volume Variance	$ —4
Expense Variance & Adjustment	2,650
Total Unabsorbed Expense	$2,646

5. Based on the above assumptions, the profit for the month of October should have been $22,959 instead of a loss of $1,265, as shown in the first statement or an inflated profit of $33,116, as shown in the second statement.

6. It would appear to the writer that the solution of the whole difficulty is explained in the paragraph on page 519 headed "Need for Monthly Inventory Adjustment." It is impossible to calculate the true monthly amount

of unabsorbed Indirect Expense without taking into consideration fluctuations in inventories of finished and semi-finished goods from month-end to month-end.

In other words Unabsorbed Indirect Expense should be calculated as follows:—

Balance in Process first of month (at Standard Rates)	
Expended during month (actual)	
Total to account for	
Less:—Absorbed in finished production (at Standard Rates)	
In Process end of month " " "	
Total unabsorbed Expense	

7. I would like to modify the remarks appearing in paragraph 6 by explaining that it is our practice to transfer the *full standard cost* of finished goods produced each month from the Manufacturing Account to Finished Stock (a separate General Ledger Account) where the detail is posted to finished stock ledgers for the purpose of calculating the cost of goods sold and the full cost value of Finished Goods inventories. Therefore, the only Indirect Expense left in process as such is the Indirect Expense at Standard Rates applicable to labor in process and manufactured ingredients or components in stock.

The Author Replies

Editor, N. A. C. A. Bulletin:

It seems that the direct cost accounting plan as published in the January 15th N. A. C. A. Bulletin is up against stiff opposition. Even the shades of dead German physicists and mathematicians have been called to the attack. With very few exceptions all commentators to date have strenuously objected to the plan, but in language which shows clearly that they have failed utterly to grasp the idea.

The goal of the plan is to state *monthly profits* correctly. The title of the article, "What Did We Earn Last Month?" certainly conveyed this idea, not to mention the textual matter which further emphasized this point.

However, the article did not bring out the fact that under the direct cost plan of accounting *annual profit* is exactly the same as under orthodox standard cost accounting!

To prove this assertion, I have prepared the tabulation given below which is based upon the following assumptions with respect to an imaginary company operating under orthodox standard cost accounting procedure:

(1) Annual fixed factory overhead expenses amount to $75,000 per quarter, or $300,000 per year.
(2) The standard manufacturing cost of normal production for the year, including the above $300,000 of fixed charges, is $1,500,000.
(3) The allowance in standard manufacturing cost for fixed charges is therefore $300,000 divided by $1,500,000, or 20%.
(4) Actual cost of materials, direct labor, and direct production expenses is equivalent (for purposes of this illustration) to the standard cost of these items—in other words there are no manufacturing variances.
(5) Sales volume is exactly the same under both the orthodox and the direct cost plan of accounting.
(6) Expenses, including in this category all charges against profit and loss except cost of sales and fixed factory charges, are the same under both the orthodox and the direct cost plan of accounting, and (for

purposes of illustration) are assumed to be $63,000 per quarter, thus eliminating them as a factor having an influence on the results. (Of course I realize that such an assumption is never actually realized in business, but this is beside the point.)

(7) Production is assumed to have occurred as follows, in which 20% of each figure represents the allowance for fixed factory charges under the orthodox accounting plan:

First Quarter	$300,000
Second Quarter	570,000
Third Quarter	175,000
Fourth Quarter	100,000

The following profit and loss statements were prepared from the above assumptions (fixed factory expenses were called indirect factory expenses in the January 15th N. A. C. A. Bulletin):

	P&L Statements (under Orthodox acctg. plan)		P&L Statements (under Direct Cost acctg. plan)	
1st Quarter:				
Sales	$184,000		$184,000	
Standard cost of sales	100,000		80,000	
Gross profit	84,000		104,000	
Expenses	63,000		63,000	
Operating profit	21,000		41,000	
Unabsorbed factory overhead	15,000		.....	
Fixed factory expenses	.....		75,000	
Net profit or loss	(profit)	$6,000	(loss)	$34,000
2nd Quarter:				
Sales	269,000		269,000	
Standard cost of sales	175,000		140,000	
Gross profit	94,000		129,000	
Expenses	63,000		63,000	
Operating profit	31,000		66,000	
Overabsorbed factory overhead	39,000		.....	
Fixed factory expenses	.....		75,000	
Net profit or loss	(profit)	70,000	(loss)	9,000
3rd Quarter:				
Sales	668,000		668,000	
Standard cost of sales	570,000		456,000	
Gross profit	98,000		212,000	
Expenses	63,000		63,000	
Operating profit	35,000		149,000	
Unabsorbed factory overhead	40,000		.....	
Fixed factory expenses	.....		75,000	
Net profit or loss	(loss)	5,000	(profit)	74,000

4th Quarter:				
Sales	388,000		388,000	
Standard cost of sales	300,000		240,000	
Gross profit	88,000		148,000	
Expenses	63,000		63,000	
Operating profit	25,000		85,000	
Unabsorbed factory overhead	55,000		.....	
Fixed factory expenses	.....		75,000	
Net profit	(loss)	30,000	(profit)	10,000
Annual Results:				
Sales	1,509,000		1,509,000	
Standard cost of sales	1,145,000		916,000	
Gross profit	364,000		593,000	
Expenses	252,000		252,000	
Operating profit	112,000		341,000	
Unabsorbed factory overhead	71,000		.....	
Fixed factory expenses	.....		300,000	
Net profit for year		41,000		41,000

Now, I ask all advocates of the standard cost accounting plan, why, in the name of common sense, should quarterly profit and loss statements (not to mention the monthly statements which show similar variations) be all cluttered up with an unabsorbed or overabsorbed burden figure which has absolutely no relation to sales, when the faults of the orthodox plan can be eliminated *without any effect on the annual results* merely by eliminating the fixed factory charges from standard manufacturing costs?

There is no justification whatever for showing the management periodic results like this:

First Quarter—profit	$ 6,000
Second Quarter—profit	70,000
Third Quarter—loss	5,000
Fourth Quarter—loss	30,000
Annual profit	$41,000

when the true story is this:

First Quarter—loss	$34,000
Second Quarter—loss	9,000
Third Quarter—profit	74,000
Fourth Quarter—profit	10,000
Annual profit	$41,000

My apologies are herewith extended to the critics of the comparative statements presented in the article, "What Did We Earn Last Month?" Undoubtedly this would have been vastly improved by a statement giving the production figures of the Stone Manufacturing Company for October, 1935. The fact is that production of finished goods was exceedingly low during that month, and this accounts for the wide disparity between the loss shown

under old style, orthodox cost accounting and the profit earned under the new style, direct cost plan. Please accept my assurance that exactly this result can happen in any business which manufactures for inventory during the months of low sales for the sole purpose of having goods on hand to sell during the peak sales portion of the year.

Some critics have stated that the effect of the direct cost plan can be obtained under present-day standard cost accounting procedure by treating cumulative unabsorbed or overabsorbed overhead as a deferred balance sheet item to be taken into profit and loss only at the end of the year. This is not only *not true,* but at the end of the year profit and loss account would have to take either a terrible sock on the chin for cumulative unabsorbed factory overhead, or suddenly swell up with a cumulative overabsorbed overhead. In either case, orthodox standard costs are open to serious question because they are based on theoretical normal production which somebody has guessed at and which experience for the year clearly indicates is generally either overstated or understated. What good are standard costs which contain arbitrary allowances for fixed factory expenses which prove to be "right" only when normal production is actually attained for the year?

The following tabulation is presented for those who advocate treating the under- or over-absorbed factory overhead item as a deferred balance sheet item until the end of the year.

	Orthodox Results		*Direct Cost Plan Results*	
1st Quarter	Profit	$21,000	Loss	$34,000
2nd Quarter	Profit	31,000	Loss	9,000
3rd Quarter	Profit	35,000	Profit	74,000
4th Quarter	Profit	25,000	Profit	10,000
Total		$112,000		$41,000
Unabsorbed factory overhead		71,000		None
Net profit		$41,000		$41,000

Is it not clear that the orthodox results are just as misleading as when the under- or over-absorbed item is taken to profit and loss each month or quarter?

Under the direct cost plan an adjustment has to be made at the end of the year *only when the ending inventory is larger or smaller than at the beginning of the year,* and as stated in the January 15th N.A.C.A. Bulletin, such an adjustment can be easily explained. Ordinarily it would not be a large adjustment. For example: using the figures given in this discussion it can be proven that *no adjustment was necessary* because total direct cost of production (excluding fixed factory overhead allowance at 20%) was equal to cost of sales on the same basis, hence the beginning and ending inventories must have been the same. It must be remembered, however, that, even under the direct cost plan, inventory at the beginning of the year contains an allowance of fixed factory charges. Here again, the allowance is 20% of the total inventory value, including the allowance in this total value.

If production volume for the year had been less than sales volume, then the inventories would have been smaller at the end of the year, and profit and loss would have been charged for 20% of the decrease. If the reverse of this were the case, then profit and loss would have been credited with 20% of the increase. In other words, the direct cost accounting plan provides for the carrying of *annual inventories* at a figure which includes an allowance for fixed factory overhead, and this allowance depends entirely upon the relation between estimated normal annual production capacity and total

actual annual fixed factory expenses. This provision is made to meet the requirements of the tax authorities and public auditors who are not yet ready to pass as reasonable inventories which are value at direct cost of materials, labor, and direct production expense only.

Perhaps the day will come when they will see the light and then the allowance for fixed factory charges can be eliminated entirely from annual inventory valuations.

In the meantime, nevertheless, those who understand and adopt the direct cost plan can secure the same benefits that have materialized in the Stone Mfg. Co. They are valuable benefits and worth going after.

JONATHAN N. HARRIS, C.P.A.
Arlington, Mass.

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